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XVII.

OBSERVATIONS OF VARIABLE STARS IN 1884.

BY EDWARD C. PICKERING.

Communicated March 11, 1885.

IN the communication entitled "Recent Observations of Variable Stars,"¹ it was stated that a similar circular would be published early in 1885. The friendly co-operation of several astronomers interested in the subject makes it practicable to present on this occasion a much fuller view of the progress of observation, in Europe as well as in America, than could be given last year. The various observers are named below in alphabetical order, with the abbreviations employed to designate them in the subsequent tabular statements.

B. These observations were made by Mr. T. W. Backhouse, at Sunderland, England. The instruments employed were a refracting telescope by Cooke, aperture $4\frac{1}{4}$ inches, with magnifying powers 38 and 75; the finder of this telescope, power 9; a field-glass and an opera-glass, with powers 4 and 2.2 respectively; other observations were made with the naked eye. The comparisons were made either in grades, in fractions of the interval between two comparison stars, or by approximate differences. A copy of the observations for 1884 has been received at the Harvard College Observatory.

C. These observations were made by Mr. S. C. Chandler, Jr., at the Harvard College Observatory. The telescope is by Clacey; aperture $6\frac{1}{4}$ inches, magnifying power generally 45, sometimes 125 or 200. The observations were made by Argelander's method. Most of them were made before April 28, and they were discontinued after June 30, owing to the requirements of other researches. They are not likely to be resumed at present.

D. These observations were made by Dr. N. C. Dunér, at the Observatory of Lund, Sweden, according to the method of Argelander.

E. These observations were made by Mr. John H. Eadie, at Bayonne, New Jersey. The telescope employed was made by John Byrne; its aperture is $3\frac{1}{4}$ inches, and the lowest magnifying power

¹ Proc. Amer. Acad. of Arts and Sciences, XIX. 296.

about 50. Argelander's method of comparison is used. A copy of the observations has been furnished to the Harvard College Observatory.

Hg. These observations were made by Dr. E. Hartwig, formerly of Strassburg, Germany, at present of Dorpat, Russia. Since his removal to Dorpat, circumstances have prevented Dr. Hartwig from making frequent observations of variable stars.

Hn. These observations were made by the Rev. J. Hagen, S. J., at the College of the Sacred Heart, Prairie du Chien, Wisconsin. The instrument is a telescope by Merz; its aperture is 3 inches. The observations were made by the division into tenths of the interval between two comparison stars. A copy of the observations has been furnished to the Harvard College Observatory. Messrs. Zwack and Zaiser have taken part in the work as assistants.

K. These observations were made by Mr. George Knott, at Knowles Lodge, Cuckfield, Hayward's Heath, England. The telescope employed was made by Alvan Clark and Sons; its aperture is $7\frac{1}{3}$ inches, and that of the finder 2 inches. The variable is compared with stars differing little from it in brightness; the magnitudes of the comparison stars, and sometimes the magnitude of the variable, are determined by the method of limiting apertures.

P. These observations were made by Mr. H. M. Parkhurst, at Brooklyn, N. Y. The instrument is a telescope made by Fitz; its aperture is 9 inches, and the magnifying powers employed are 56 and 150. Many of the observations were made by Argelander's method, and the remainder with photometric apparatus devised by Mr. Parkhurst, and partially described in the previous circular. A copy of the observations has been furnished to the Harvard College Observatory.

Sk. Professor Safarik of Prague, Austria, has published a notice of his observations of variable stars in the *Vierteljahrsschrift der Astronomischen Gesellschaft*, XIX. 144, from which the memoranda given in this circular are derived.

Sr. These observations were made according to Argelander's method by Mr. E. F. Sawyer, at Cambridgeport, Massachusetts, by means of an opera-glass for the brighter stars and of a field-glass for the others. The same plan of observation will be followed during 1885.

W. These observations were made by Dr. F. Wilsing, at the *Astro-physikalisches Observatorium*, Potsdam, Germany. The wedge photometer was employed in part of the comparisons, but in such cases estimates in grades of the difference in brightness between the stars compared were almost always added. These estimates appear to be somewhat more accurate than the photometric observations, which will

therefore be employed in future chiefly in determining the brightness of the comparison stars.

Zk. The observations of Assistant G. Zwack have already been mentioned under the heading Hn.

Zr. The observations of Assistant Zaiser have already been mentioned under the heading Hn.

The summary of the progress of observation during 1884 is contained in the last column of Table I. The preceding columns are repeated, after correcting some numerical errors, from the corresponding table in the statement published last year. The first column of the left-hand page gives a provisional number for designating the star. This number is taken from Schönfeld's Catalogue when the star occurs there; in other cases, a letter is added to the number. Other letters may be employed in effecting additional interpolation. The second column contains numbers from the Photometric Catalogue called Harvard Photometry, and published in Volume XIV. of the *Annals of the Harvard College Observatory*. The following columns contain the usual designation of the star, its right ascension and declination for 1875, magnitude at maximum and minimum, and period in days.

The first column of the right-hand page repeats the number to be used for the provisional designation of the star. The second gives the class to which the star belongs, upon the system of classification employed in the *Proceedings of the American Academy of Arts and Sciences*, XVI. 257. Upon this system, Class I. includes temporary stars; Class II., stars undergoing large variations in periods of several months; Class III., irregularly variable stars undergoing but slight changes in brightness; Class IV., variable stars of short period, like β *Lyræ* or δ *Cephei*; Class V., Algol stars, or those which at regular intervals undergo sudden diminutions of light, lasting for but a few hours. The third column gives the name of the discoverer, and the fourth column the date.

The last column, as above stated, contains the number of nights on which each star was observed by the astronomer whose designation is attached to the number. A dash preceding a designation shows that the star has been observed, but that the number of nights has not been furnished. The abbreviations employed have been explained above. The letter K. is preceded by two numbers, the first of which relates to observations made in 1883.

Table I. is followed by a series of remarks containing observed dates of maximum and minimum, and other information received from the observers with regard to particular stars.

TABLE I. — VARIABLE STARS.

No.	H.P.	Name.	R. A. 1875.	Dec. 1875.	Max.	Min.	Per.
			h. m. s.	° ' "	m.	m.	d.
0a	—	Ceti	0 15 26	—20 45.1	5.2	7.0	—
1	51	T Cassiopeiae	16 29	+55 5.9	6.5—7.0	11—11.2	436
2	54	R Andromedæ	17 28	+37 53.0	5.6—8.6	<12.8	404.7
3	—	S Ceti	17 42	—10 1.3	7.0—8.0	<10.7	323.6
4	—	B Cassiopeiae	17 52	+63 27.2	>1	?	—
5	—	T Piscium	25 31	+13 54.6	9.5—10.2	10.5—11.0	Irr.
6	94	α Cassiopeiae	33 25	+55 51.1	2.2	2.8	Irr.
6a	—	U Cephei	51 18	+81 12.1	7.0	9.5	2.5
7	—	S Cassiopeiae	1 10 30	+71 57.2	6.7—8.5	<13	615
8	—	S Piscium	11 2	+ 8 16.3	8.8—9.3	<13	406.6
8a	—	Piscium	16 22	+12 12.7	10	14	—
8b	—	Ceti	19 31	— 4 36.6	6.5	7.8	—
8c	—	R Sculptoris	21 13	—33 11.5	5½	7½	207
9	—	R Piscium	24 12	+ 2 14.1	7.4—8.3	<12.5	345
10	—	S Arietis	57 55	+11 55.5	9.1—9.8	<13	288.8
11	—	R Arietis	2 9 1	+24 28.4	7.6—8.5	11.9—12.7	186.2
12	370	α Ceti	13 1	— 3 32.7	1.7—5.0	8—9	331.3
13	—	S Persei	13 54	+58 0.8	8.5?	<9.7	—
14	—	R Ceti	19 39	— 0 44.6	7.9—8.7	<12.8	167.1
15	—	T Arietis	41 22	+16 59.3	7.9—8.2	9.4—9.7	324
16	489	ρ Persei	57 10	+38 21.3	3.4	4.2	Irr.
17	496	β Persei	3 0 2	+40 28.4	2.2	3.7	2.9
18	—	R Persei	22 6	+35 14.3	8.1—9.2	12.5	208.8
19	657	λ Tauri	53 45	+12 8.2	3.4	4.2	4.0
20	—	T Tauri	4 14 43	+19 14.3	9.2—11.5	12.8—<	Irr.
21	—	R Tauri	21 27	+ 9 52.9	7.4—9.0	<13	325.6
22	—	S Tauri	22 22	+ 9 40.1	9.9	<13	378
22a	—	Doradus	35 19	—62 19.4	5½	6½	—
23	—	V Tauri	44 48	+17 19.6	8.3—9.0	<12.8	168.6
24	—	R Orionis	52 13	+ 7 56.3	8.7—8.9	<13	378.8
25	877	ε Aurigæ	53 0	+43 38.2	3.0	4.5	Irr.
26	880	R Leporis	53 55	—14 59.7	6—7	8.5?	437.8
27	—	R Aurigæ	5 7 12	+53 26.6	6.5—7.4	12.5—12.7	465
27a	—	S Aurigæ	18 52	+34 2.3	9.4	<13	—
28	—	S Orionis	22 50	— 4 47.5	8.3?	<12.3	—
29	1005	δ Orionis	25 37	— 0 23.6	2.2?	2.7	Irr.
29a	—	Orionis	29 42	— 5 33.5	10	13	—
30	1091	α Orionis	48 24	+ 7 23.3	1	1.4	Irr.
31	1160	η Geminorum	6 7 20	+22 22.4	3.2	3.7—4.2	229.1
31a	—	Monocerotis	16 26	— 2 8.1	7	<10	—
32	1205	T Monocerotis	18 29	+ 7 9.1	6.2	7.6	26.8
33	—	R Monocerotis	32 21	+ 8 50.7	9.5	11.5	Irr.
34	1256	S Monocerotis	34 6	+10 0.5	4.9	5.4	3.4
35	—	R Lynceis	50 59	+55 30.2	9?	<12.3	—
36	1334	ζ Geminorum	56 41	+20 45.1	3.7	4.5	10.2
37	—	R Geminorum	59 49	+22 53.8	6.6—7.3	<12.3	371.0
38	—	R Canis min.	7 1 50	+10 13.1	7.2—7.9	9.5—10.0	335.0
38a	—	Puppis	9 43	—44 26.2	3½	<6	135
38b	—	V Geminorum	16 10	+13 21.8	8.5	12—13½	276
38c	1417	U Monocerotis	24 50	— 9 31.0	6.0	7.2	46.0
39	—	S Canis min.	25 56	+ 8 35.0	7.2—8.0	<11	332.2
40	—	T Canis min.	27 3	+12 0.6	9.1—9.7	<13	335.2
40a	—	Canis min.	34 34	+ 8 40.2	8½	13.5	405

TABLE I.—VARIABLE STARS.

No.	Class.	Discoverer.	Date.	Observations, 1884.
0a	—	Chandler	1881	35 Sr.
1	II.	Krüger	1870	4 C. 9 E. — Sk. 4 W.
2	II.	Argelander	1858	7 C. 3 D. 7 E. — Sk. 44 Sr. 8 W.
3	II.	Borelly	1872	1 C. 13 E. 2 P. — Sk.
4	I.	Tycho Brahe	1572	—
5	II.	Luther	1855	3 C. 7 E. 2 P.
6	III.	Birt	1831	1 B. 13 E. 27 Sr.
6a	V.	Ceraski	1880	4 Hg. 10 Hn. 7 W. 3 Zk.
7	II.	Argelander	1861	4 C. 26 P. — Sk.
8	II.	Hind	1851	2 C. 6 E.
8a	—	Peters	1880	10 P.
8b	—	Gould	1874?	4 Hn.
8c	II.	Gould	1872?	—
9	II.	Hind	1850	2 C. 1 E. — Sk.
10	II.	Peters	1865	4 C. 5 P.
11	II.	Argelander	1857	6 C. 18 Hn. 8 P. — Sk. 12 Zk.
12	II.	Fabricius	1596	17 B. 9 C. — Hg. — Sk. 24 Sr.
13	II.	Krüger	1873	5 C. 9 Hn. — Sk. 2 Zk.
14	II.	Argelander	1866	9 C. 5 P. — Sk.
15	II.	Auwers	1870	3 C. 22 Hn. — Sk. 12 Zk.
16	II.?	Schmidt	1854	47 Sr.
17	V.	Montanari	1669	6 B. 3 Hg. 1 Sr.
18	II.	Schönfeld	1861	10 C. 9 E. 19 Hn. — Sk. 4 W. 12 Zk.
19	V.	Baxendell	1848	2 B. 7 Zr.
20	—	Hind	1861	1 C. 4,1 K. 3 P. — Sk.
21	II.	Hind	1849	5 C. 10 E. 3 P. — Sk.
22	II.	Oudemans	1855	5 C. 8 E. 2 P. — Sk.
22a	—	Gould	1874?	—
23	II.	Auwers	1871	6 C. 9 P.
24	II.	Hind	1848	7 C. 1 E. 1,0 K.
25	III.	Fritsch	1821	6 P. 48 Sr.
26	II.	Schmidt	1855	5 C. 2,0 K. — Sk. 11 Sr.
27	II.	At Bonn	1862	7 C. 21 Hn. 2,0 K. — Sk. 14 Zk.
27a	II.	Dunér	1881	7 C. 5 D. 9 P.
28	II.	Webb	1870	6 C. 8 E. 7,6 K. 1 P. — Sk.
29	III.	J. Herschel	1834	28 Sr.
29a	—	Bond	1863	1 E. 1 P.
30	III.	J. Herschel	1836	3 Zr.
31	II.?	Schmidt	1866	6 B. 12 Sr.
31a	—	Schönfeld	1883	12 Sr.
32	IV.	Gould	1871	83 Sr.
33	II.	Schmidt	1861	3 C.
34	IV.	Winnecke	1867	29 Sr.
35	II.	Krüger	1874	11 C. 11 P.
36	IV.	Schmidt	1844	1 B. 24 Sr. 1 Zr.
37	II.	Hind	1848	6 C. 1,2 K. 25 P. 3 Sr.
38	II.	At Bonn	1854	9 C. 19 Hn. 2,0 K. 7 W. 17 Zk.
38a	II.	Gould	1872	7 C.
38b	II.	Baxendell	1880	23,9 K.
38c	II.?	Gould	1873	49 Sr.
39	II.	Hind	1856	9 C. 6,4 K. 6 W.
40	II.	Schönfeld	1865	4 C. 1,0 K.
40a	II.	Baxendell	1879	10 C. 29,6 K.

TABLE I. — *Continued.*

No.	H.P.	Name.	R. A. 1875.	Dec. 1875.	Max.	Min.	Per.
			<i>h. m. s.</i>	<i>° ′</i>	<i>m.</i>	<i>m.</i>	<i>d.</i>
41	—	S Geminorum	7 35 32	+23 44.6	8.2—8.7	<13	294.2
42	—	T Geminorum	41 48	+24 2.7	8.1—8.7	<13	288.1
42a	—	S Puppis	43 6	-47 8.3	7½	9	—
43	—	U Geminorum	47 41	+22 19.7	8.9—9.7	13.1	Irr.
43a	—	Puppis	55 0	-12 32	8½	<14	310
44	—	R Cancri	8 9 40	+12 6.5	6.2—8.3	<11.7	354.4
45	—	V Cancri	14 36	+17 40.9	6.8—7.2	<12	272
46	—	U Cancri	28 37	+19 19.5	8.2—10.4	<13	305.7
47	—	S Cancri	36 48	+19 29.0	8.2	9.8	9.5
48	—	S Hydræ	47 3	+ 3 32.4	7.5—8.5	<12.2	256.4
49	—	T Cancri	49 32	+20 19.7	8.2—8.5	9.3—10.5	484.2
50	—	T Hydræ	49 35	- 8 39.8	7.0—8.1	<12.5	289.4
50a	—	R Carinæ	9 29 6	-62 14.2	4.4	9.3	313
51	—	R Leonis min.	38 4	+35 5.2	6.1—7.5	<11.0	374.7
52	1752	R Leonis	40 50	+12 0.5	5.2—6.4	9.4—10.0	312.6
52a	—	l Carinæ	41 49	-61 55.9	3.7	5.2	31.2
52b	—	Leonis	53 3	+21 51.6	8½	8.6<13	280?
52c	—	Antliæ	10 4 22	-37 7.1	6½	<8	—
52d	—	Carinæ	5 23	-60 56.3	6½	9	—
52e	—	U Leonis	17 21	+14 38.1	9½	Inv.	—
52f	1869	Hydræ	31 22	-12 44.1	4½	6	—
53	1880	R Ursæ maj.	35 47	+69 25.9	6.0—8.1	12	303.4
54	—	η Argus	40 13	-59 1.6	>1	6.3	Irr.
54a	—	T Carinæ	50 18	-59 51.2	6.2	6.9	—
55	—	R Crateris	54 25	-17 39.2	>8	<9	—
56	—	S Leonis	11 4 23	+ 6 8.5	9.0—9.7	<13	187.6
57	—	T Leonis	32 2	+ 4 3.9	10?	<13	—
58	—	X Virginis	55 27	+ 9 46.1	7.8?	<10	—
59	—	R Comæ	57 51	+19 28.8	7.4—8.0	<13	363
60	—	T Virginis	12 8 12	- 5 20.4	8.0—8.8	<13	337
61	—	R Corvi	13 10	-18 33.5	6.8—7.3	<11.5	318.6
61a	—	— Virginis	27 26	- 3 43.8	8	14	210±
62	—	T Ursæ maj.	30 42	+60 10.6	7.0—8.3	12.2	255.6
63	2147	R Virginis	32 10	+ 7 40.6	6.5—7.5	10.0—10.9	145.7
63a	—	R Muscæ	34 28	-68 43.3	6.6	7.3	0.9
64	—	S Ursæ maj.	38 28	+61 46.7	7.7—8.2	10.2—11.1	224.8
65	—	U Virginis	44 46	+ 6 14.0	7.7—8.1	12.2—12.8	207.4
66	—	W Virginis	13 19 35	- 2 43.4	8.7—9.2	9.8—10.4	17.3
67	—	V Virginis	21 21	- 2 31.4	8.0—9.0	<13	251
68	2275	R Hydræ	22 53	-22 38.0	4.0—5.5	10?	469.3
69	2289	S Virginis	26 29	- 6 33.0	5.7—7.8	12.5	374.0
69a	—	Virginis	14 3 37	-12 42.7	9	14	—
69b	—	R Centauri	7 35	-59 19.8	6	10	—
70	—	T Bootis	8 14	+19 39.1	9.7?	<13	—
71	—	S Bootis	18 41	+54 22.7	8.1—8.5	13.2	272.4
72	—	R Camelopardi	27 8	+84 23.8	7.9—8.6	12?	266.2
73	2445	R Bootis	31 41	+27 16.9	5.9—7.5	11.3—12.2	223.0
73a	2459	Bootis	37 56	+27 3.6	5.2	6.1	370?
73b	—	Bootis	48 33	+18 12.1	9.1	12.0—13.6	173.8
74	2506	δ Libræ	54 18	- 8 1.2	4.9	6.1	2.3
74a	—	Libræ	15 3 37	-19 33.9	10	<13.5	700±
74b	—	R Triang. Austr.	8 37	-66 2.1	6.6	8.0	3.4
75	—	U Coronæ	13 6	+32 6.4	7.6	8.8	3.5
76	—	S Libræ	14 13	-19 56.1	8.0	12.5?	—
77	—	S Serpentis	15 48	+14 45.9	7.6—8.6	12.5?	361.0

TABLE I. — *Continued.*

No.	Class.	Discoverer.	Date.	Observations, 1884.
41	II.	Hind	1848	4 C.
42	II.	Hind	1848	8 C. 4 W.
42a	—	Gould	1874?	—
43	II.?	Hind	1855	18 C. 38,25 K. — Sk.
43a	II.	Pickering	1881	3 C.
44	II.	Schmidt	1829	5 C.
45	II.	Auwers	1870	9 C. 15 P. — Sk.
46	II.	Chacornac	1853	9 C. 16,15 K. — Sk. 3 W.
47	V.	Hind	1848	2 Hn.
48	II.	Hind	1848	5 C.
49	II.	Hind	1850	5 C. 18 P.
50	II.	Hind	1851	10 C.
50a	II.	Gould	1871	—
51	II.	Schönfeld	1863	7 C. 53 P. 20 Sr.
52	II.	Koch	1782	12 C. — Sk. 42 Sr. 12 W.
52a	—	Gould	1871	5 C.
52b	II.	Becker	1882	3 C.
52c	—	Gould	1872	—
52d	—	Gould	1871	—
52e	—	Peters	1876	—
52f	—	Gould	1871	—
53	II.	Pogson	1853	5 C. 22 Hn. 3,5 K. 32 Sr. 7 W. 15 Zk.
54	II.?	Burchell	1827	—
54a	—	Thome	1872	—
55	II.	Winnecke	1861	6 C. — Sk.
56	II.	Chacornac	1856	5 C. 3 W.
57	II.	Peters	1865	1 C.
58	II.	Peters	1871	5 C.
59	II.	Schönfeld	1856	4 C. 8,3 K. 19 P.
60	II.	Boguslawski	1849	5 C. 4 W.
61	II.	Karlinski	1867	10 C. — Sk.
61a	II.	Henry	—	9 C.
62	II.	Hencke	1856	11 C. — Sk. 26 Sr. 10 W.
63	II.	Harding	1809	8 C. 33 Sr. 10 W.
63a	IV.	Gould	1871	—
64	II.	Pogson	1853	11 C. 3,5 K. — Sk. 31 Sr. 10 W.
65	II.	Harding	1831	8 C. — Sk. 7 Sr.
66	II.?	Schönfeld	1866	11 C.
67	II.	Goldschmidt	1857	11 C. 9 P. 7 W.
68	II.	Miraldi	1704	4 C. — Sk. 26 Sr.
69	II.	Hind	1852	10 C. 16,0 K.
69a	II.	Palisa	1880	7 C.
69b	—	Gould	1871	—
70	I.?	Baxendell	1860	—
71	II.	At Bonn	1860	8 C. 11 Hn. — Sk. 3 W. 7 Zk.
72	II.	Hencke	1858	7 C. 10 P. — Sk. 4 W.
73	II.	At Bonn	1858	12 C. 6 Hn. — Sk. 46 Sr. 5 Zk.
73a	—	Schmidt	1867	9 C. 4 Zr.
73b	II.	Baxendell	1880	—
74	V.	Schmidt	1859	4 Zr.
74a	II.	Palisa	1878	5 C.
74b	IV.?	Gould	1871	—
75	V.	Winnecke	1869	8 Hn. 5 Zk.
76	II.	Borelly	1872	7 C. 8 P. — Sk.
77	II.	Harding	1828	10 C. 8 Hn. 7 Zk.

TABLE I. — *Continued.*

No.	H.P.	Name.	R. A. 1875.	Dec. 1875.	Max.	Min.	Per.
			h. m. s.	° ' "	m.	m.	d.
78	2553	S Coronæ	15 16 18	+31 49.1	6.1 — 7.8	11.9 — 12.5	361.0
78a	—	Libræ	34 46	—20 46.5	9	<14	—
79	2639	R Coronæ	43 25	+28 32.5	5.8	13.0	Irr.
80	2647	R Serpentis	44 56	+15 30.8	5.6 — 7.6	<11	357.6
80a	—	V Coronæ	45 4	+39 57.0	7.7	12	360.0
81	—	R Libræ	46 32	—15 51.7	9.2 — 10.0	<13	723
82	2678	T Coronæ	54 16	+26 16.5	2.0	9.5	—
83	—	R Herculis	16 0 37	+18 42.5	8.0 — 9.0	<13	319.0
83a	—	W Scorpïi	4 23	—19 48.6	10	<13	224.3
84	—	T Scorpïi	9 36	—22 39.9	7	<10	—
85	—	R Scorpïi	10 12	—22 38.2	9? — 10.5	<12.5	223
86	—	S Scorpïi	10 13	—22 35.2	9.1 — 10.5	<12.5	176.9
86a	—	Ophiuchi	14 40	— 7 24.0	9.0	<13.5	326
87	—	U Scorpïi	15 16	—17 35.3	9?	<12	—
87a	—	Ophiuchi	19 46	—12 8.5	7.5	10.5	365
88	—	U Herculis	20 16	+19 10.8	6.6 — 7.7	11.4 — 11.6	408.3
89	2772	g Herculis	24 32	+42 9.6	5	6.2	Irr.
90	—	T Ophiuchi	26 35	—15 51.8	10	<12.5	—
91	—	S Ophiuchi	27 4	—16 53.7	8.3 — 9.0	<12.5	233.8
91a	—	W Herculis	30 48	+37 35.6	8.0	<14.5	239
91b	—	Urs. Min.	31 40	+72 31.9	8.6	10.5	180?
91c	—	R Draconis	32 22	+67 0.7	7.2	13<	245.9
92	2828	S Herculis	46 13	+15 9.2	5.9 — 6.8	11.5 — 12.2	303
93	2839	Ophiuchi	52 30	—12 42.0	5.5	12.5	—
93a	—	V Herculis	53 41	+35 15.5	9.0	11.7	—
94	—	R Ophiuchi	17 0 36	—15 55.5	7.6 — 8.1	<12	302.4
95	2879	a Herculis	8 57	+14 32.1	3.1	3.9	Irr.
95a	2883	U Ophiuchi	10 12	+ 1 21.0	6.1	6.8	0.9
96	2890	u Herculis	12 42	+33 14.1	4.6	5.4	38.5
97	—	Serpentarii	23 9	—21 22.4	>1	?	—
98	2972	X Sagittarii	39 41	—27 46.8	4	6	7.0
99	3035	W Sagittarii	57 2	—29 35.1	5	6.5	7.6
100	—	T Herculis	18 4 22	+31 0.1	7.2 — 8.3	11.4 — 12.1	165.1
101	—	T Serpentis	22 43	+ 6 13.1	9.1 — 10.0	<12.8	342.3
102	—	V Sagittarii	24 4	—18 20.9	7.5?	9.5?	—
103	—	U Sagittarii	24 32	—19 12.7	7.0	8.3	6.7
104	—	T Aquilæ	39 45	+ 8 36.9	8.8	9.5	Irr.
105	3176	R Scuti	40 49	+ 5 50.2	4.7 — 5.7	6.0 — 8.5	71.1
105a	—	κ Pavonis	44 3	—67 23.2	4.0	5.5	9.1
106	3193	β Lyræ	45 28	+33 13.0	3.4	4.5	12.9
107	3224	R Lyræ	51 32	+43 47.1	4.3	4.6	46.0
108	—	S Coron. Austr.	52 43	—37 7.2	9.8	11.5?	6.1
109	—	R Coron. Austr.	53 29	—37 7.2	10.5 — 11.5	<12.5	31
110	—	R Aquilæ	19 0 21	+ 8 2.6	6.4 — 7.4	10.9 — 11.2	345.1
111	—	T Sagittarii	9 1	—17 11.2	7.6 — 8.1	<11	381
112	—	R Sagittarii	9 21	—19 31.5	7.0 — 7.2	<12	270.0
113	—	S Sagittarii	12 7	—19 15.1	9.7 — 10.4	<12.7	230
114	3395	R Cygni	33 28	+49 55.1	5.9 — 8.0	13	425.3
115	—	11 Vulpeculæ	42 26	+27 0.5	3	?	—
116	—	S Vulpeculæ	43 16	+26 58.7	8.4 — 8.9	9.0 — 9.5	67.5
117	3434	χ Cygni	45 46	+32 36.0	4.0 — 6.0	12.8	406.5
118	3436	η Aquilæ	46 6	+ 0 41.2	3.5	4.7	7.2
119	—	S Cygni	20 2 53	+57 37.6	8.8 — 9.5	<13	322.8
120	—	R Capricorni	4 17	—14 38.2	8.8 — 9.7	<13	347
121	—	S Aquilæ	5 52	+15 14.9	8.9 — 9.9	10.7 — 11.8	147.2

TABLE I. — *Continued.*

No.	Class.	Discoverer.	Date.	Observations, 1884.
78	II.	Hencke	1860	5 C. 8 Hn. 2,1 K. - Sk. 45 Sr. 10 W. 5 Zk.
78a	—	Peters	1878	—
79	II.?	Pigott	1795	6 C. - Sk. 88 Sr. 10 W.
80	II.	Harding	1826	9 C. 5 P.
80a	II.	Dunér	1878	3 C. 15 D. - Sk. 8 W.
81	II.	Pogson	1858	8 C. 1,1 K.
82	I.	Birmingham	1866	21 B. 7 Hn. 3,1 K. 2 P. 4 Zk.
83	II.	At Bonn	1855	2 C. 10 Hn. 4 P. 6 Zk.
83a	II.	J. Palisa	1877	4 C. 6 P.
84	I.	Auwers	1860	3 C.
85	II.	Chacornac	1853	6 C. 11,1 K. 6 P.
86	II.	Chacornac	1854	6 C. 7,1 K. 6 P.
86a	II.	Schönfeld	1881	7 C.
87	I.?	Pogson	1863	—
87a	—	Dunér	1881	8 C. 11 D.
88	II.	Hencke	1860	3 C.
89	III.	Baxendell	1857	83 Sr.
90	II.	Pogson	1860	2 C.
91	II.	Pogson	1854	2 C. 1 Hn.
91a	—	Dunér	1880	14 C. 8 Hn. 9 P. 4 W. 5 Zk.
91b	II.	Pickering	1881	11 C. 1,1 K. - Sk.
91c	II.	Geelmuyden	1876	9 C. - Sk. 35 Sr. 12 W.
92	II.	At Bonn	1856	4 C. 10 Hn. - Sk. 7 Zk.
93	I.	Hind	1848	—
93a	II.	Baxendell	1880	9 C.
94	II.	Pogson	1853	8 C.
95	III.	W. Herschel	1795	3 Zr.
95a	V.	Sawyer	1881	5 Sr. 4 W.
96	III.	Schmidt	1869?	3 Zr.
97	I.	Fabricius	1604	2 Zr.
98	IV.	Schmidt	1866	29 Sr.
99	IV.	Schmidt	1866	35 Sr.
100	II.	At Bonn	1857	7 C. 11 Hn. - Sk. 7 Sr. 6 W. 6 Zk.
101	II.	Baxendell	1860	2 C.
102	II.	Quirling	1865	2 C.
103	IV.	Schmidt	1866	1 C.
104	II.	Winnecke	1860	1 C.
105	II.	Pigott	1795	89 Sr.
105a	IV.	Thome	1872	—
106	IV.	Goodricke	1784	10 Zr.
107	II.?	Baxendell	1856	62 Sr.
108	IV.?	Schmidt	1866	—
109	II.?	Schmidt	1866	—
110	II.	At Bonn	1856	1 C. - Sk.
111	II.	Pogson	1863	1 C. - Sk.
112	II.	Pogson	1858	5 P. - Sk.
113	II.	Pogson	1860	10 P. - Sk.
114	II.	Pogson	1852	3 C. 9 Hn. 12 P. - Sk. 5 Zk.
115	I.	Anthelm	1670	2 Zr.
116	II.	Hind	1861	4 C. 13 Hn. 5,0 K. 4 W. 6 Zk.
117	II.	Kirch	1686	2 C. 2 Hn. 56 P. - Sk. 41 Sr. 5 W. 2 Zk.
118	IV.	Pigott	1784	79 Sr.
119	II.	At Bonn	1860	6 C. 7,17 K. 18 P.
120	II.	Hind	1848	- Sk.
121	II.	Baxendell	1863	2 C. 11 E. 2 P. 12,14 K.

TABLE I.—*Continued.*

No.	H. P.	Name.	R. A. 1875.	Dec. 1875.	Max.	Min.	Per.
			h. m. s.	° ' "	m.	m.	d.
122	—	R Sagittæ	20 8 22	+16 21.0	8.5—8.7	9.8—10.4	70.4
123	—	R Delphini	8 53	+ 8 42.7	7.6—8.5	12.8	284.0
124	3547	P Cygni	13 11	+37 38.7	3—5	<6	—
125	—	U Cygni	15 44	+47 30.1	7.8?	9.8?	—
126	3557	R Cephei	34 29	+88 45.2	5?	10?	—
126a	—	— Cygni	37 17	+47 41.8	8	12	423.
127	—	S Delphini	37 19	+16 38.4	8.4—8.6	10.4—11.1	275.6
128	—	T Delphini	39 34	+15 56.7	8.2—8.9	<13	331.4
129	—	U Capricorni	41 11	—15 14.4	10.2—10.8	<13	203.5
130	3654	T Cygni	42 12	+33 55.0	5.5?	6?	—
131	—	T Aquarii	43 20	— 5 36.5	6.7—7.0	12.4—12.7	203.2
132	—	R Vulpeculæ	58 49	+23 19.5	7.5—8.5	12.5—13.0	137.5
132a	—	Capricorni	21 0 19	—24 25.5	9½	14	—
132b	—	T Cephei	7 52	+67 58.9	5.6	9.5	382
133	—	T Capricorni	15 6	—15 41.4	8.9—9.7	<13	269.4
134	—	S Cephei	36 45	+78 3.6	7.4—8.5	11.5	485
134a	—	Nova Cygni	37 2	+42 18.2			—
135	3845	α Cephei	39 41	+58 12.4	4?	5?	Irr.
136	—	T Pegasi	22 2 48	+11 55.7	8.8—9.3	<12.5	367.5
137	3981	δ Cephei	24 32	+57 46.6	3.7	4.9	5.4
137a	—	Lacertæ	37 43	+41 43.0	8.6	<13.5	315.
138	—	S Aquarii	50 25	—21 0.6	7.7—9.1	<11.5	279.4
139	4078	β Pegasi	57 45	+27 24.2	2.2	2.7	Irr.
140	—	R Pegasi	23 0 22	+ 9 52.1	6.9—7.7	12?	382.0
141	—	S Pegasi	14 14	+ 8 14.2	7.6	<12.2	—
142	4193	R Aquarii	37 21	—15 58.7	5.8—8.5	11?	388.0
143	4234	R Cassiopeæ	52 4	+50 41.5	4.8—6.8	<12	425.9

REMARKS.

2. Max. 1883, December 1. Sr.
6. Light has remained nearly constant. Sr.
6a. Min. 1884, February 19, March 15, August 24, September 8. Hg.
12. Max. 1884, March 6 (approximate). Magn. 4.6. Sr.
16. Light has remained nearly constant. Sr.
17. Min. 1884, February 5, February 28, September 27. Hg.—1884, November 29, 13h. 39m. G. M. T. Duration of observations, 4h. 35m. Sr.
25. Max. 1884, February 27. Min. 1884, January 18, March 18. Sr.
27a. Approximate period, 270 days. D.
29. Light apparently constant. Sr.
31a. Max. 1884, December 10 (approximate). Sr.
38b. Max. 1883, February 25. Magn. 8.6. K.
38c. Max. 1884, February 3, March 11. Min. 1884, January 5, February 24, April 9. Sr.
43. Max. 1883, October 25; 1884, January 28, October 24. Hg.—1883, January 30 (approximate). Magn. about 9.5. 1884, January 26. Magn. 9.6. 1884, May 15 (approximate). 1884, October 22. Magn. 9.4. K.
46. Max. 1884, March 8. Magn. 8.5. K.
52. Max. 1884, February 5 (approximate). Magn. 6.7. Sr.

TABLE I. — *Continued.*

No.	Class.	Discoverer.	Date.	Observations, 1884.
122	II.?	Baxendell	1859	2 C. 22 E. 11 Hn. 1 P. 5 Zk.
123	II.	Hencke	1859	1 C. 8 Hn. — Sk. 4 Zk.
124	I.	Janson	1600	11 Zr.
125	II.	Knott	1871	3 C. 13,20 K. 16 P. — Sk.
126	II.?	Pogson	1856	1 C. 32 E. — Sk.
126a	II.	Birmingham	1881	— Hg. 11,8 K. 5 P.
127	II.	Baxendell	1860	2 C. 12 E. 8 P. — Sk.
128	II.	Baxendell	1863	4 C. 12 E. 18,17 K. — Sk. 4 W.
129	II.	Pogson	1858	13 P.
130	—	Schmidt	1864	7 E. 35 Sr.
131	II.	Goldschmidt	1861	3 C. 12 P. — Sk.
132	II.	At Bonn	1858	4 C. 12 E. 13,16 K. 2 P. 5 W.
132a	—	Peters	1867	12 C. 7 P.
132b	II.?	Ceraski	1878	12 E. — Hg. 29,25 K. — Sk. 4 W.
133	II.	Hind	1854	9 P.
134	II.	Hencke	1858	6 C. 12 E. — Sk.
134a	I.	Schmidt	1876	—
135	III.?	Hind	1848	2 B. 1 C. 12 E. 1 P. — Sk. 10 Zr.
136	II.	Hind	1863	2 C. 9 P.
137	IV.	Goodricke	1784	10 Zr.
137a	—	Deichmüller	1883	4 C. 7 E. — Hg. 6,16 K.
138	II.	Argelander	1853	4 P. — Sk.
139	III.	Schmidt	1847	9 B. 28 Sr.
140	II.	Hind	1848	1 C. 5 E. 1 P.
141	II.	Marth	1864?	4 C. 2 E.
142	II.	Harding	1811	4 C. 8 P. — Sk. 21 Sr.
143	II.	Pogson	1853	8 C. 1,0 K. 8 P. — Sk.

53. Max. 1884, August 29. Magn. 7.1. Sr.

62. Max. 1884, October 17. Magn. 7.8. Sr.

63. Max. 1884, April 11. Magn. 7.1. Sr.

64. Max. 1884, September 17 $\pm$ 1 day. Magn. 7.7. Sr.

73. Max. 1884, October 5. Magn. 7. 5. Sr.

78. Max. 1884, May 5. Magn. 7.3. Sr.

79. Slight fluctuations of light. Sr.

80a. Max. 1878, October 21.7. Period, 356.02 days. D.

85. Max. 1883, July 9. Magn. 10.1. K.

87a. V *Ophiuchi*. Approximate period 300 days. D.

89. Max. 1884, June 27, September 8, October 22. Min. 1884, May 30, August 4, September 23, November 14. Sr.

91c. Max. 1884, September 5. Magn. 7.5. Sr.

105. Max. 1884, June 7, August 3, October 17, November 30 (approximate). Min. 1884, July 12, September 15, November 11. Sr.

107. Two remarkable outbursts of light observed in 1884, from November 7 to 11, and from November 21 to 30. Sr.

117. Max. 1884, November 23. Magn. 5.4. Sr.

119. Max. 1884, early in December. K.

125. Max. 1884, February 1. Magn. 7.8. Period, 461 days. Min. 1883, June 14. Magn. 11.5. 1884, September 21. Magn. 11.1. K.

TABLE II.—INDEX TO DESIGNATIONS.

Constellation.	R.	S.	T.	U.	V.	W.	Misc.
Andromeda	2	....	....	....	....	....	
Antlia	....	....	....	....	....	....	-,52c.
Aquarius	142	138	131	....	....	....	
Aquila	110	121	104	....	....	....	η,118.
Argo	....	....	....	....	....	....	η,54.
Aries	11	10	15	....	....	....	
Auriga	27	27a	....	....	....	....	ε,25.
Bootes	73	71	70	....	....	....	-,73a. -,73b.
Camelopardus	72	....	....	....	....	....	
Cancer	44	47	49	46	45	....	
Canis Minor	38	39	40	....	....	....	-,40a.
Capricornus	120	....	133	129	....	....	-,132a.
Carina	50a	....	54a	....	....	....	l,52a. -,52d.
Cassiopeia	143	7	1	....	....	....	B,4. α,6.
Centaurus	69b	....	....	....	....	....	
Cepheus	126	134	132b	6a	....	....	μ,135. δ,137.
Cetus	14	3	....	....	....	....	-,0a. -,8b. ο,12.
Coma Beren.	59	....	....	....	....	....	
Corona Aus.	109	108	....	....	....	....	
Corona Bor.	79	78	82	75	80a	....	
Corvus	61	....	....	....	....	....	
Crater	55	....	....	....	....	....	
Cygnus	114	119	130	125	....	....	χ,117. P,124. -,126a. Nova, 134a.
Delphinus	123	127	128	....	....	....	
Doradus	....	....	....	....	....	....	-,22a.
Draco	91c	....	....	....	....	....	
Gemini	37	41	42	43	38b	....	η,31. ζ,36.
Hercules	83	92	100	88	93a	91a	g,89. α,95. u,96.
Hydra	68	48	50	....	....	....	-,52f.
Lacerta	....	....	....	....	....	....	-,137a.
Leo	52	56	57	52e	....	....	-,52b.
Leo Minor	51	....	....	....	....	....	
Lepus	26	....	....	....	....	....	
Libra	81	76	....	....	....	....	δ,74. -,74a. -,78a.
Lynx	35	....	....	....	....	....	
Lyra	107	....	....	....	....	....	β,106.
Monoceros	33	34	32	38c	....	....	-,31a.
Musca	63a	....	....	....	....	....	
Ophiuchus	94	91	90	95a	....	....	-,86a. -,87a. -,93. Nova, 97.
Orion	24	28	....	....	....	....	δ,29. -,29a. α,30.
Pavo	....	....	....	....	....	....	κ,105a.
Pegasus	140	141	136	....	....	....	β,139.
Perseus	18	13	....	....	....	....	ρ,16. β,17.
Pisces	9	8	5	....	....	....	-,8a.
Puppis	....	42a	....	....	....	....	-,38a. 43a.
Sagitta	122	....	....	....	....	....	
Sagittarius	112	113	111	103	102	99	X,98.
Scorpius	85	86	84	87	....	83a	
Sculptor	8c	....	....	....	....	....	
Scutum	105	....	....	....	....	....	
Serpens	80	77	101	....	....	....	
Serpentarius	....	....	....	....	....	....	See Ophiuchus.
Taurus	21	22	20	....	23	....	λ,19.
Triang. Aus.	74b	....	....	....	....	....	
Ursa Major	53	64	62	....	....	....	
Ursa Minor	....	....	....	....	....	....	-,91b.
Virgo	63	69	60	65	67	66	X,58. -,61a. -,69a.
Vulpecula	132	116	....	....	....	....	11,115.

128. Max. 1883, October 6. Magn. 9.6. 1884, September 15. Magn. 9.0. K.
 132. Min. 1884, August 10. Magn. 12.7. Max. 1884, October 15. Magn. 7.6.
 K.
 132b. Max. 1883, February 6. Magn. 6.3. 1884, March 7. Magn. 6.8. Min.
 1883, August 23. Magn. 9.9. 1884, August 11. Magn. 9.7. K.
 142. Max. 1883, December 25 (approximate). Magn. 6.3. Sr.

Table II. enables the number of any star in Table I. to be found from its usual designation. The constellations are arranged alphabetically in the first column, and the numbers are placed under the respective headings R, S, T, U, V, and W. Thus R, S, and T *Aquarii* are respectively Nos. 142, 138, and 131 in Table I. In the column headed "Misc." are given other designations; thus η *Aquilæ* is No. 118, and η *Argus* is No. 54. The number is preceded by a dash when no letter has been definitely assigned to the corresponding star; thus, -52c in the second line indicates that a variable star in *Antlia*, No. 52c in Table I., has not been definitely designated by a letter.

The list of suspected variables, given in Table II. of the statement made in 1884, is not here repeated, since from the nature of the case such a list can only be provisional. It should be remarked that all the stars which were inserted on the authority of Dr. Peters are considered by him to be certainly variable. Dr. Dunér also furnishes the place of a variable star which he observed on 23 days in 1884; it was not given in either of the tables published last year. The place, reduced to 1875, is as follows: R. A. 14h. 24m. 41s., δ $+39^{\circ} 25'.2$. The period is about 405 days. Four variable stars were detected by means of the observations made for the Cordoba Zone-Catalogue; see that work, p. xiv., and Dr. Gould's letter in the *Astronomische Nachrichten*, CXI. 63. The places for 1875 are as follows: R. A. 15h. 45m. 22s., Dec. $-35^{\circ} 55'.3$; R. A. 22h. 10m. 53s., Dec. $-30^{\circ} 13'.6$; R. A. 22h. 27m. 4s., Dec. $-67^{\circ} 55'.9$; R. A. 23h. 49m. 58s., Dec. $-50^{\circ} 28'.9$.

Table III. indicates the progress of observation of suspected variables given in Table II. of the statement made in 1884. The stars are designated in the first column by Mr. Chandler's provisional numbers, as in the previous statement. The second column gives the number of observations made by each observer, as in the last column of Table I. The third column indicates the result of these observations.

TABLE III.—OBSERVATIONS OF SUSPECTED VARIABLES.

No.	Obs. 1884.	Results.	No.	Obs. 1884.	Results.
1	17 Hn.	Constant.	345	16 Hn. 14 Zk.	Constant.
9	11 P.		347	32 Hn. 29 Zk.	Constant.
47	2 B.		365	16 Hn. 16 Zk.	Constant.
73	7 P.		373	28 Hn. 25 Zk.	Constant.
81	1 B.		407	14 Hn. 14 Zk.	Doubtful.
87	9 P.		459	6 P.	Variable.
93	5 K.	Constant.	471	4 P.	Constant.
111	2 B. 7 Hn. 4 Zk.		509	1 B. 28 Hn. 20 Zk.	
113	5 Hn. 3 Zk		547	2 B. 22 Hn. 12 Zk.	Constant.
139	5 P.	Constant.	567	7 P.	Constant.
143	7 P.		601	5 P.	
145	8 Hn. 8 Zk.		615	14 P.	
147	9 Hn. 8 Zk.	Constant.	625	13 Hn.	Constant.
205	21 P.	Prob. var.	635	2 K.	
294	11 P.	Variable.			

It is hoped that observers of variable stars will continue to furnish accounts of their work during each year as soon as possible after its close. It is desirable that these accounts should be received at the Harvard College Observatory as early as February 1 of the following year.